1350.0 - Australian Economic Indicators, 1992

ARCHIVED ISSUE Released at 11:30 AM (CANBERRA TIME) 20/04/1992

1992 Feature Article - International Comparisons of Gross Domestic Product as Purchasing Power Parity

This article was published in Australian Economic Indicators April 1992 issue on 1 April 1992.

Introduction

In order to compare output or expenditure data for different countries it is necessary to convert values expressed in different currency units into a common unit of currency. A method often used is to convert data for different currencies into a common currency (usually US dollars), using market exchange rates as the currency convertor. However, the uniform application of the exchange rate to all goods and services produced and sold within the economy can result in quite misleading comparisons between countries. Exchange rates are influenced by a variety of financial, political, economic and institutional factors which are unrelated, or not closely related, to factors determining national price levels. They do not convey meaningful information about relative price levels within an individual country, and are therefore inappropriate for deriving comparisons of measures of output between countries. In order to obtain valid international comparisons of GDP, and GDP per head, a measure of relative prices between countries is required. Purchasing power parities (PPPs) provide such a measure.

The Organisation for Economic Co-operation and Development (OECD) co-ordinates a project which has produced PPPs for member countries for a number of years with the most recent being 1990. Summary results were published in the 1991 edition of its National Accounts: Volume One, released early in 1992. More detailed results are expected to be published in a supplement to the publication later in 1992. The ABS recently published estimates of PPPs and of gross domestic product and its components adjusted for PPPs in Gross Domestic Product at Purchasing Power Parity in OECD Countries, 1990 (cat. no. 5226.0).

The meaning of Purchasing Power Parities

PPPs are essentially indexes of relative national price levels. In the same way that a consumer price index and other price indexes reflect changes in prices of a defined basket of goods and services within a given country over time, PPPs present a picture of how the level of prices in one country compares with that in another country at a given time. Similarly, where conventional price indexes are used to deflate current price values to derive changes in ‘real’ values within a country over time, so PPPs can be used to adjust current price values to obtain ‘real’ value comparisons between countries at a point in time. In this respect PPPs are particularly useful for comparing GDP per head, regarded by many international organisations as a key indicator of living standards and progress in economic development.

Calculation of PPPs

In its simplest form, a PPP is the ratio of the prices of the same commodity between two countries. For example,

	Australia	United States
	Price in $A	Price in $US
Commodity A	0.75	0.50
Commodity B	1.00	1.10

The Australian PPP for commodity A relative to its price in the United States is

0.75 / 0.50 = 1.5

The Australian PPP for commodity B relative to its price in the United States is

1.00 / 1.10 = 0.91

The PPP for commodity A shows that $A1.50 is needed to buy in Australia the quantity of commodity A which can be bought for $US1.00 in the USA. Similarly, it would require $A0.91 to buy, in Australia, the quantity of commodity B which can be bought for $US1.00 in the USA.

PPPs for individual commodities can be aggregated, using weights derived from national expenditure data, to calculate an overall PPP for each country. The current price, or ‘nominal’, value of GDP for each country can then be deflated by its PPP to obtain an estimate of GDP which can be compared across countries. The OECD has calculated PPPs for individual member countries relative to average prices across the OECD to derive the real expenditure values contained in the ABS and OECD publications.

Comparative price level indexes

Comparative price level indexes are derived by dividing the PPPs for each country by the corresponding average OECD PPPs and then by the exchange rate (per $US). Thus, they are standardised PPPs expressed in terms of a single currency - the $US. Like PPPs, they permit comparisons of the relative prices of goods and services within a country but unlike PPPs, they also permit comparisons of prices between countries. Thus, given the expenditure patterns and exchange rates prevailing during 1990, one can compare the prices of goods and services in Australia with those in other OECD countries.

Estimates for years prior to 1990

For the latest issue of cat. no. 5226.0, estimates of gross domestic product at purchasing power parity for years prior to 1990 have been derived by dividing current price estimates of gross domestic product by estimates of PPPs for earlier years. The latter have been derived by extrapolating retrogressively the 1990 PPPs using each country’s annual rate of inflation relative to that of the United States. The measure of inflation used for each country is the implicit price deflator of gross domestic product.

Background to the OECD PPP project

The OECD first became involved in the study of PPPs in the early 1950s. In the 1960s and 1970s the main focus of this work shifted to the Statistical Offices of the United Nations and the European Community. In 1982 the OECD resumed work on PPPs, resulting in calculations of some member country PPPs and real gross domestic product and its components for 1980. Australia first became involved with the PPP project in the 1985 round. The ABS provided detailed expenditure and commodity price data for both the 1985 and 1990 projects. Most of the data contained in the latest issue of 5226.0 relate to 1990.

Analysis of results

The following comments refer to estimates of gross domestic product (GDP) at average OECD prices using purchasing power parities - referred to hereafter as adjusted GDP.

In 1990, Australia's adjusted GDP per head continued to fall below the OECD average. As indicated in Table 1, Australia's adjusted GDP per head in 1985 was 2 per cent below the OECD average. In 1990 it had fallen to 6 per cent below the OECD average. As a consequence, Australia's ranking dropped from joint 10th of the 24 OECD member countries in 1985 to joint 13th in 1990. The USA continued its lead over all other OECD members with a GDP per head in 1990 of $US21,449 (34.5 per cent higher than Australia's $US15,951). Since 1985, Australia's average annual growth rate of adjusted GDP per head (4.9 per cent) has lagged behind those of the USA (5.3 per cent) and the OECD average (5.9 per cent).

TABLE 1. RANKING OF OECD COUNTRIES' GDP PER HEAD AT AVERAGE OECD PRICES, USING PURCHASING POWER PARITIES, 1985 AND 1990

	Ranking		% variation from OECD Average	
Country	**1985**	**1990**	**1985**	**1990**
USA	1	1	30	26
Switzerland	2	2	27	24
Luxembourg	5	3	8	14
Canada	3	4	16	12
Germany	4	5	9	8
Japan	13	6	-4	4
France	8	7	3	3
Denmark	6	8	4	-1
Sweden	6	8	4	-1
Austria	12	10	-3	-2
Belgium	15	11	-6	-3
Finland	15	11	-6	-3
AUSTRALIA	**10**	**13**	**-2**	**-6**
Italy	17	13	-7	-6
Norway	9	13	0	-6
Iceland	10	16	-2	-7
Netherlands	14	16	-5	-7
United Kingdom	18	18	-9	-8
New Zealand	19	19	-13	-22
Spain	20	20	-36	-31
Ireland	21	21	-43	-37
Portugal	23	22	-55	-51
Greece	22	23	-54	-57
Turkey	24	24	-81	-80

Compared with the average OECD expenditure distribution in relation to adjusted GDP per head in 1990, Australia spent relatively little on private consumption (6 per cent less) and capital expenditure on equipment (9 per cent less), but relatively more on government consumption (11 per cent more) and capital expenditure on construction (29 per cent more).

These deviations from the OECD average expenditure distribution mirror, to some extent, the deviations in Australia's price structure from the OECD average. Australian prices were relatively higher for private consumption (4 per cent higher) and equipment (5 per cent higher) and relatively lower for government consumption (2 per cent lower) and construction (14 per cent lower). Thus, at this broad level of expenditure, Australia spent proportionally more on the goods

and services that were relatively cheap - government consumption and construction - and proportionally less on the goods and services which were relatively expensive - private consumption and equipment.

According to 1990 PPP estimates, 1.39 Australian dollars were equivalent to one US dollar. This compares with the prevailing exchange rate of $A1.28 to $US1.00 in 1990. In this sense the Australian dollar was ‘overvalued’ with respect to the American dollar by about 9 per cent. With respect to the OECD as a whole, however, the Australian dollar was ‘undervalued’ by about 5 per cent.

Table 2 contains price level indexes for broad categories of goods and services for Australia, the ‘Group of Seven’ major industrial economies and New Zealand for 1990. Similar comparisons at a more detailed level in 5226.0 show that Australians paid less for food, communications and housing than consumers in any of the ‘Group of Seven’ countries but paid more for personal transport equipment.

TABLE 2. COMPARATIVE PRICE LEVEL INDEXES(a) FOR SELECTED COUNTRIES, 1990 (OECD = 100)

	Australia	Japan	USA	Canada	Germany	France	UK	Italy	NZ
PRIVATE FINAL CONSUMPTION EXPENDITURE	99	126	88	101	112	108	95	101	86
Food, beverage and tobacco	84	148	80	105	101	102	96	99	85
Clothing and footwear	100	110	75	101	134	153	94	139	88
Gross rent, fuel and power	109	143	100	105	122	95	85	68	86
Household equipment and operation	98	114	87	100	105	112	94	113	90
Medical and health care	94	68	123	95	109	80	71	86	74
Transport and communication	106	112	84	105	113	113	119	109	85
Education, recreation and culture	105	107	89	100	111	123	86	131	94
Miscellaneous goods and services	107	156	78	98	109	122	107	116	89
GOVERNMENT FINAL CONSUMPTION EXPENDITURE	93	103	105	109	120	104	78	107	74
GROSS FIXED CAPITAL EXPENDITURE	89	117	76	85	120	108	117	114	88
Construction	82	130	79	77	118	94	117	100	82
Machinery and equipment	100	104	74	97	126	131	119	137	97
INCREASE IN STOCKS	75	93	61	78	88	91	80	91	71
BALANCE OF EXPORTS AND IMPORTS	100	100	100	100	100	100	100	100	100
GROSS DOMESTIC PRODUCT	95	119	88	99	114	107	96	104	84

(a) Derived from average exchange rates for 1990 and the corresponding purchasing power parities for each item.

Conclusion

Purchasing power parities provide a measure of relative prices between countries and therefore enable meaningful comparisons of measures of expenditure and GDP. Australia’s ranking against other OECD countries using such measures is made possible by ABS participation in the OECD PPP project. The latest results of this project have recently been published in 'Gross Domestic Product at Purchasing Power Parity in OECD Countries', 1990 (cat. no. 5226.0). This article has provided an explanation of the methodology used and some of the results.

More details are available from the publication mentioned above.

This feature article was contributed by Charles Aspden and Alan Tryde, ABS.

ATTACHMENT

Aggregation methods

In 1988 and again in 1989, EUROSTAT (the Statistical Office of the European Community) and the OECD, together with the United Nations Statistical Office, convened a group of experts to discuss aggregation methods. The experts recognised that comparisons of price and volume aggregates are used for many different purposes and that there is no one method of aggregation which can be considered satisfactory for all these purposes.

The Geary-Khamis (GK) method uses a weighted arithmetic mean of prices, and was used to produce the estimates published in the 1985 issue of 5226.0. It is known to be affected by the Gerschenkron effect - i.e. a country whose price structure differs from the average price structure used as weights in the aggregation process will have relatively higher volume levels than it would have had if weights more characteristic of its price structure had been used. On the other hand, the GK method provides results which are additive: a requirement not met by aggregation methods free of the Gerschenkron effect.

The experts recommended the calculation and dissemination of two sets of results: one set to be aggregated using the EItelo-Koves-Szulc (EKS) method which uses a weighted geometric mean of prices, the other to be aggregated using the GK method. However, only results derived using the EKS method are available for 1990 at present.

Estimates obtained by the EKS method are not additive, but there is no Gerschenkron effect and they are better suited for comparisons of the prices and volumes of an individual aggregate between countries, for example comparisons between countries of expenditure on or prices of a particular commodity. Those obtained by the GK method are affected by the Gerschenkron effect, but they are additive and better suited to the analysis of price and volume structures across countries, for example comparisons of the **relative** prices of commodities within one country with the **relative** prices within another country. Details of the two methods are available on request.

An outcome of the change in methodology is that the estimates presented in the 1985 issue of 5226.0 are not comparable with the estimates presented in the latest issue. To enable comparisons to be made in the latest issue, estimates have been recalculated for years prior to 1990 as described in the article above.

This page last updated 18 December 2009